OIPE JC104
FEB 17 2005
PATENT & TRADEMARK OFFICE

Patent
Serial No: 09/784,952
Atty. Docket No. 29287-117

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	
Toshinori Ono, *et al.*	Examiner: Nikolas J. Uhlir
Serial No.: 09/784,952	
Filed: February 16, 2001	Art Unit: 1773
For: MAGNETIC RECORDING MEDIUM, THE MANUFACTURING METHOD AND MAGNETIC RECORDING APPARATUS USING THE SAME	

TRANSMITTAL OF APPEAL BRIEF UNDER 37 CFR 1.192

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

ATTENTION: Board of Patent Appeals and Interferences

Sir:

Attached hereto is Appellants' Brief under 37 CFR § 1.192 for the above-referenced application. The Commissioner is authorized to charge the requisite fee $500.00 (37 CFR 1.17(c) and all other fees associated with this submission to Deposit Account No. 11-0600.

Respectfully submitted,

David J. Zibelli

Date: February 17, 2004

David J. Zibelli
Registration No. 36,794

KENYON & KENYON
1500 K Street, N.W. - Suite 700
Washington, D.C. 20005-1257
Tel: (202) 220-4200
Fax: (202) 220-4201

OIPE
FEB 17 2005
JC104
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	
Toshinori Ono, *et al.*	Examiner: Nikolas J. Uhlir
Serial No: 09/784,952	
Filed: February 16, 2001	Art Unit: 1773
For: MAGNETIC RECORDING MEDIUM, THE MANUFACTURING METHOD AND MAGNETIC RECORDING APPARATUS USING THE SAME	

APPEAL BRIEF under 37 CFR 41.37

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

ATTENTION: Board of Patent Appeals and Interferences

Sir:

Applicants submit this Appeal Brief in the above-referenced application. A Notice of Appeal was filed on October 18, 2004, and an extension for time under 37 CFR 1.136 is hereby authorized to be charged to deposit account 11-0600.

REAL PARTY IN INTEREST

Hitachi Global Storage Technologies Japan, Ltd. is the real party in interest for all issues related to this application by virtue of assignments recorded at Reel 11598, Frame 0633 and Reel 14750, Frame 0219.

RELATED APPEALS OR INTERFERENCES

There are no other appeals, interferences, or judicial proceedings known to Appellants, appellants' legal representative, or assignee which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

02/18/2005 SZEWDIE1 00000135 110600 09784952
01 FC:1402 500.00 DA

STATUS OF CLAIMS

This application contains claims 1-16. Claims 3-7 have been withdrawn as drawn to a non-elected invention. Claims 1-2 and 8-16 stand finally rejected as obvious over prior art and are the subject of this appeal.

STATUS OF AMENDMENTS

An Amendment After Final Rejection was filed in this application on September 15, 2004. A declaration of Doctor Suzuki was filed with the September 15, 2004 Amendment. The October 8, 2004 Advisory Action indicates that for purposes of appeal the amendment will be entered and that the declaration was considered.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 recites a magnetic recording medium (Fig. 1, pages 11-18) the magnetic recording medium having a magnetic film (magnetic layer 5, page 12, ll. 13-18, page13, l. 20-page 14, l. 24) on a non-magnetic substrate (substrate 1, page 11, ll. 19-23, page 12, l. 24-page 13, l. 1) by intercalating at least an under layer (underlayer 4, page 12, ll. 9-13, page 13, ll. 7-19), the proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating mainly composed of carbon for protecting the magnetic film (protective coating 6, page 14, l. 25-page 15, l. 23) exceeds 20% (exceeds 20% at page page 4, l. 28-page 5, l. 7 and page17, ll. 17-23), wherein a lubricating film of perfluoroether having at least one functional group is provided on the protective coating (lubricant layer 7, page 5, ll. 8-12, page 7, ll. 18-23, page 15, l. 24-page 16, l. 4).

Independent claim 8 recites a magnetic storage apparatus (Fig. 4, page 21, l. 10-page 22, l.), comprising a magnetic recording medium (magnetic disc medium 61, page 21, ll. 10-21) that in the magnetic recording medium having a magnetic film (magnetic layer 5, page 12, ll. 13-18, page13, l. 20-page 14, l. 24) on a non-magnetic substrate (substrate 1, page 11, ll. 19-23, page 12, l. 24-page 13, l. 1) by intercalating at least an under layer (underlayer 4, page 12, ll. 9-13, page 13, ll. 7-19), a proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating mainly composed of carbon for protecting the magnetic film (protective coating 6, page 14, l. 25-page 15, l. 23) exceeds 20% (exceeds 20% at page page 4, l. 28-page 5, l. 7 and page17, ll. 17-23), and a lubricating film of perfluoroether

having at least one functional group provided on the protective coating (lubricant layer 7, page 5, ll. 8-12, page 7, ll. 18-23, page 15, l. 24-page 16, l. 4), a driving part for driving the magnetic recording medium, a magnetic head having a recording part and a reproducing part, a recovery reproducing signal processing part for giving and receiving a signal to and from the magnetic head, and a magnetoresistive head as the reproducing part of the magnetic head.

Claim 11 recites a magnetic storage apparatus (Fig. 4, page 21, l. 10-page 27, l. 28), comprising a magnetic recording medium (magnetic disc medium 61, page 21, ll. 10-21) having a magnetic film (magnetic layer 5, page 12, ll. 13-18, page13, l. 20-page 14, l. 24) on a non-magnetic substrate (substrate 1, page 11, ll. 19-23, page 12, l. 24-page 13, l. 1) by intercalating at least an under layer (underlayer 4, page 12, ll. 9-13, page 13, ll. 7-19), a proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating mainly composed of carbon for protecting the magnetic film (protective coating 6, page 14, l. 25-page 15, l. 23) exceeds 20% (exceeds 20% at page page 4, l. 28-page 5, l. 7 and page17, ll. 17-23), and a lubricating film of perfluoroether having at least one functional group provided on the protective coating (lubricant layer 7, page 5, ll. 8-12, page 7, ll. 18-23, page 15, l. 24-page 16, l. 4), a driving part for driving the magnetic recording medium (driving part 62, page 21, ll. 12-13), a magnetic head having a recording part and a reproducing part (magnetic head 63 is formed by a recording part and a reproducing part, page 21, ll. 13-14), a recording reproducing signal processing part magnetic head (recording reproducing signal processing unit 65 for producing an output signal from the magnetic head, page 21, ll. 17-19), and a magnetoresistive head as the reproducing part of the magnetic head (reproducing part of magnetic head is formed by magnetoresistive head (page 21, l. 22-page 22, l. 14).

Claim 13 recites a magnetic recording medium (Fig. 1, pages 11-18), comprising: a non-magnetic substrate (substrate 1, page 11, ll. 19-23, page 12, l. 24-page 13, l. 1), a magnetic film (magnetic layer 5, page 12, ll. 13-18, page13, l. 20-page 14, l. 24), an under layer mainly composed of Cr (underlayer 4 is formed of Cr, page 12, ll. 9-13, page 13, ll. 7-19) and a seed layer (seed layers 2 and 3, page11, l. 24-page 12, line 5), which are provided between said non-magnetic substrate and said magnetic film (seed layers 2 and 3 and underlayer 4 are between substrate 1 and magnetic film 5, Fig. 1), a diamond-like carbon protective layer mainly composed of carbon for protecting the magnetic film (protective coating 6, page 14, l. 25-page 15, l. 23), and a lubricating film of perfluoroether having at least one functional group (lubricant layer 7, page 5, ll. 8-12, page 7, ll. 18-23, page 15, l. 24-page 16, l. 4), wherein a proportion of

functional groups having N atoms per 100 carbon atoms in said diamond-like carbon protective layer exceeds 20% (a proportion of functional groups having N atoms per 100 carbon atoms in said diamond-like carbon protective layer exceeds 20% at page 4, l. 28-page 5, l. 7 and page17, ll. 17-23).

Claim 14 recites a magnetic recording medium (Fig. 1, pages 11-18), the magnetic recording medium having a magnetic film (magnetic layer 5, page 12, ll. 13-18, page13, l. 20-page 14, l. 24) on a non-magnetic substrate (substrate 1, page 11, ll. 19-23, page 12, l. 24-page 13, l. 1) by intercalating at least a seed layer (seed layers 2 and 3, page11, l. 24-page 12, line 5) and an under layer mainly composed of Cr (underlayer 4 is formed of Cr, page 12, ll. 9-13, page 13, ll. 7-19), the proportion of functional group composed of at least one of the -COOH, -C=O, -COH, and -NH2 per 100 carbon atoms in a diamond-like carbon protective mainly composed of carbon for protecting the magnetic film exceeds 20% (a proportion of functional groups having -COOH, -C=O, -COH, and -NH2 atoms per 100 carbon atoms in said diamond-like carbon protective layer exceeds 20%, page 4, l. 28-page 5, l. 7 and page17, ll. 17-23), and a lubricating film of perfluorether having at least one of the functional group (lubricant layer 7, page 5, ll. 8-12, page 7, ll. 18-23, page 15, l. 24-page 16, l. 4).

GROUNDS OF REJECTION TO BE REVIEWED

The Final Rejection rejects claims 1-2, 12-13 and 15-16 under 35 U.S.C. §103 over Yokosawa (USP 6,001,479) in view of Ootake (USP 5,958,542) and Veerasamy (USP 6,303,225). The Final Rejection also rejects claims 8 and 11 under 35 U.S.C. §103 over Yokosawa (USP 6,001,479) and Ootake (USP 5,958,542) as applied to claims 2 and 10, and further in view of Hosoe (USP 5,759,681).

ARGUMENT

A. Rejection of claims 1-2, 12-13 and 15-16 under 35 U.S.C. §103 over Yokosawa in view of Ootake and Veerasamy

The applied references do not disclose or suggest at least a proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating

mainly composed of carbon for protecting the magnetic film exceeds 20%, as recited in independent claims 1, 8, 13 and 14 of the application. Accordingly, even if combined, the applied references would not have rendered obvious any of these claims. Moreover, one of ordinary skill in the art would not have combined the references as suggested by the Examiner. Further details of these arguments are discussed below.

In rejecting claims under 35 U.S.C. §103, the Examiner bears the initial burden of presenting a *prima facie* case of obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). Further, the Examiner must not only identify the elements in the prior art, but also show some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead the individual to combine the relevant teachings of the references. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Such evidence is required in order to establish a *prima facie* case of obviousness. In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984).

The Examiner has failed to establish a *prima facie* case of obviousness in rejecting the claims on appeal. In the Final Rejection, the Examiner admits that Yokosawa does not disclose a proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating mainly composed of carbon for protecting the magnetic film exceeds 20%, but asserts that Ootake discloses a DLC film containing from 10-35 atomic % N or H is suitable, and that it would have been obvious to utilize a DLC film containing 35 atomic % N as taught by Ootake as the DLC film utilized by Yokosawa. As supposed motivation for this combination, the Examiner refers to Ootake supposedly teaching the equivalence of pure DLC, DLC containing N and DLC containing H as suitable materials for use as a protective film. See paragraphs 7-11.

The Examiner then asserts that it is known that doping a DLC film with nitrogen results in the formation of NH_2 reactive groups on the surface of the film, referring to Veerasamy at col. 7, lines 35-50. The Examiner then takes the position that the DLC film of Yokosawa as modified by Ootake will have 35 NH_2 groups per 100 carbon atoms.

Even if combined, as suggested, the resulting combination would not include a diamond-like protective coating with a proportion of functional groups having N atoms per 100 carbon

atoms exceeding 20% as required by the independent claims 1, 8, 13 and 14 of the application. While Ootake discloses a DLC film containing from 10-35 atomic % N, Ootake does not disclose or suggest a proportion of N atoms per 100 carbon atoms exceeding 20%, as required by the claims.

In response to the Examiner's assertions regarding Veerasamy, Appellants submitted the September 15, 2004 Response to Office Action and the Declaration of Dr. Hiroyuki Suzuki. In the Declaration, Dr. Suzuki points out that sputtering cannot create amine NH_2 functional groups in paragraphs 3-5.

Dr. Suzuki further points out that the teachings of Veersamy are inapplicable to the teachings of Ootake, and in particular, that sputtering and doping are very different processes, where a percentage of an atom in one cannot be simply achieved by the other. One process is used to form a layer, while the other adds dopants in a layer that has already been made. Accordingly, one of ordinary skill in the art would not have combined these teachings as suggested.

Further, the declaration of Dr. Suzuki points out that even if doping as in Veerasamy is conducted after a layer is made by sputtering as in Ootake, it should not cause the proportion of functional groups containing N in DLC to exceed 20%, because the proportion of functional groups containing N in DLC will only be caused by doping as in Veerasamy and will not be affected by the sputtered layer containing nitrogen as in Ootake. As such, even if combined, the combination will not result in the claimed invention.

In response, in the October 8, 2004 Advisory Action, the Examiner states on page 2:

> "Applicants have not provided any evidence which establishes that a sputtered nitrogenated film containing 35% N will not necessarily contain the required amount of functional groups for these broad claims."

The Examiner further states on page 3:

> "The Applicant has not shown (by comparison to the closest prior art or otherwise) that exposing a DLC film containing 35 atomic % N will not result in a film having the required number of functional groups. A mere assertion that the prior art is "not the same" is not a persuasive argument. If applicant provided some concrete evidence, i.e. data or article that supports their position, the examiner would be happy to reconsider the argument."

As asserted above, none of the applied references disclose or suggest a proportion of N atoms per 100 carbon atoms exceeding 20%, as required by the claims. The Examiner ignores the fact that neither Ootake, nor the other references, provide a teaching that relates a proportion of N atoms per 100 carbon atoms, much less that the proportion exceeds 20%, as required by the independent claims on appeal. The Examiner's position that Appellants must show that the combination would "not necessarily contain the required amount of functional groups" is not supported by the law. The Examiner must establish a *prima facie* case of obviousness, and he has not done so in the present case, since none of the applied references disclose or suggest a proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating mainly composed of carbon for protecting the magnetic film exceeds 20%, as required by the independent claims.

For the above reasons, it is submitted that claims 1, 8, 13 and 14 would not have been obvious over the applied references. Claims 2, 12, 15 and 16 would not have been obvious for the same reasons based on their dependency from these independent claims. Reversal of the rejection is requested.

B. Rejection of claims 8 and 11 under 35 U.S.C. §103 over Yokosawa and Ootake and further in view of Hosoe

Claims 8 and 11 also recite a proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating mainly composed of carbon for protecting the magnetic film exceeds 20%. Claims 8 and 11 would not have been obvious for the same reasons discussed above regarding the other claims on appeal, and because Hosoe does not solve the above-noted deficiencies of the other applied references. Reversal of the rejection is requested.

CONCLUSION

Applicant respectfully requests reversal of the rejections of claims 1, 2, 8 and 11-16. These claims are allowable over the cited art.

Respectfully submitted,

Date: February 17, 2005

David J. Zibelli
Registration No. 36,394

KENYON & KENYON
1500 K Street, N.W.
Washington, D.C. 20005
Tel: (202) 220-4200
Fax: (202) 220-4201

OIPE JC104
FEB 17 2005
PATENT & TRADEMARK OFFICE

CLAIMS APPENDIX

1. A magnetic recording medium, the magnetic recording medium having a magnetic film on a non-magnetic substrate by intercalating at least an under layer, the proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating mainly composed of carbon for protecting the magnetic film exceeds 20%,

wherein a lubricating film of perfluoroether having at least one functional group is provided on the protective coating.

2. The magnetic recording medium according to claim 1, wherein said diamond-like carbon at least one of the -COOH, -C=O, -COH, and -CNH2 is included as the functional group.

3. (Withdrawn)

4. (Withdrawn)

5. (Withdrawn)

6. (Withdrawn)

7. (Withdrawn)

8. A magnetic storage apparatus, comprising a magnetic recording medium that in the magnetic recording medium having a magnetic film on a non-magnetic substrate by intercalating at least an under layer, a proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating mainly composed of carbon for protecting the magnetic film exceeds 20%, and a lubricating film of perfluoroether having at least one functional group provided on the protective coating,

a driving part for driving the magnetic recording medium,

a magnetic head having a recording part and a reproducing part,

a recovery reproducing signal processing part for giving and receiving a signal to and from the magnetic head, and a magnetoresistive head as the reproducing part of the magnetic head.

9. (Canceled).

10. (Canceled).

11. A magnetic storage apparatus, comprising a magnetic recording medium having a magnetic film on a non-magnetic substrate by intercalating at least an under layer, a proportion of functional groups having N atoms per 100 carbon atoms in a diamond-like carbon protective coating mainly composed of carbon for protecting the magnetic film exceeds 20%, and a lubricating film of perfluoroether having at least one functional group provided on the protective coating,

a driving part for driving the magnetic recording medium, a magnetic head having a recording part and a reproducing part,

a recording reproducing signal processing part magnetic head, and a magnetoresistive head as the reproducing part of the magnetic head.

12. The magnetic recording medium according to claim 1, wherein the functional group in said diamond-like carbon is identified by a tag modification method using molecules which have functional groups interacting with the protective coating surface functional groups quantitatively and irreversibly by molecular recognition, and contain fluorine atoms which have high sensitivity coefficient to ESCA.

13. A magnetic recording medium, comprising:

a non-magnetic substrate;

a magnetic film;

an under layer mainly composed of Cr and a seed layer, which are provided between said non-magnetic substrate and said magnetic film;

a diamond-like carbon protective layer mainly composed of carbon for protecting the magnetic film; and

a lubricating film of perfluoroether having at least one functional group, wherein a proportion of functional groups having N atoms per 100 carbon atoms in said diamond-like carbon protective layer exceeds 20%.

14. A magnetic recording medium, the magnetic recording medium having a magnetic film on a non-magnetic substrate by intercalating at least a seed layer and an under layer mainly

composed of Cr, the proportion of functional group composed of at least one of the -COOH, -C=O, -COH, and -NH2 per 100 carbon atoms in a diamond-like carbon protective mainly composed of carbon for protecting the magnetic film exceeds 20%, and a lubricating film of perfluorether having at least one of the functional group.

15. A magnetic recording medium according to claim 13, wherein said proportion of functional group is identified by tag modification method using molecules which have functional groups interacting with the protective coating surface functional groups quantitatively and irreversibly by molecular recognition, and contain fluorine atoms which have high sensitivity coefficient to ESCA.

16. A magnetic recording medium according to claim 14, wherein said proportion of functional group is identified by tag modification method using molecules which have functional groups interacting with the protective coating surface functional groups quantitatively and irreversibly by molecular recognition, and contain fluorine atoms which have high sensitivity coefficient to ESCA.

EVIDENCE APPENDIX

The declaration of Dr. Suzuki set forth below was filed as an attachment to the September 15, 2004 response to office action. The Examiner indicates in the October 8, 2004 Advisory Action, that for purposes of appeal these items will be entered.